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Determinants of Chinese Government Size: An Extreme Bounds Analysis

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Abstract: This paper studies the factors associated with the size of the public sector as measured by government spending at the level of Chinese provinces using the method of extreme bounds analysis to identify robust correlates with public sector size. We find that almost all traditional "economic" and "social stability" factors are insignificant and not robust to model specification changes. In contrast, "political" factors such as the degree of fiscal decentralization and national transfers to provincial governments tend to be significant and robust. Our findings suggest that repeated government attempts to reduce the relative size of the Chinese government sector have failed because the political factors determining government spending haven't changed.

Keywords: Government Size; Fiscal Decentralization; Wagner's Law; Extreme Bounds Analysis

JEL Classifications: C52, H70, P20

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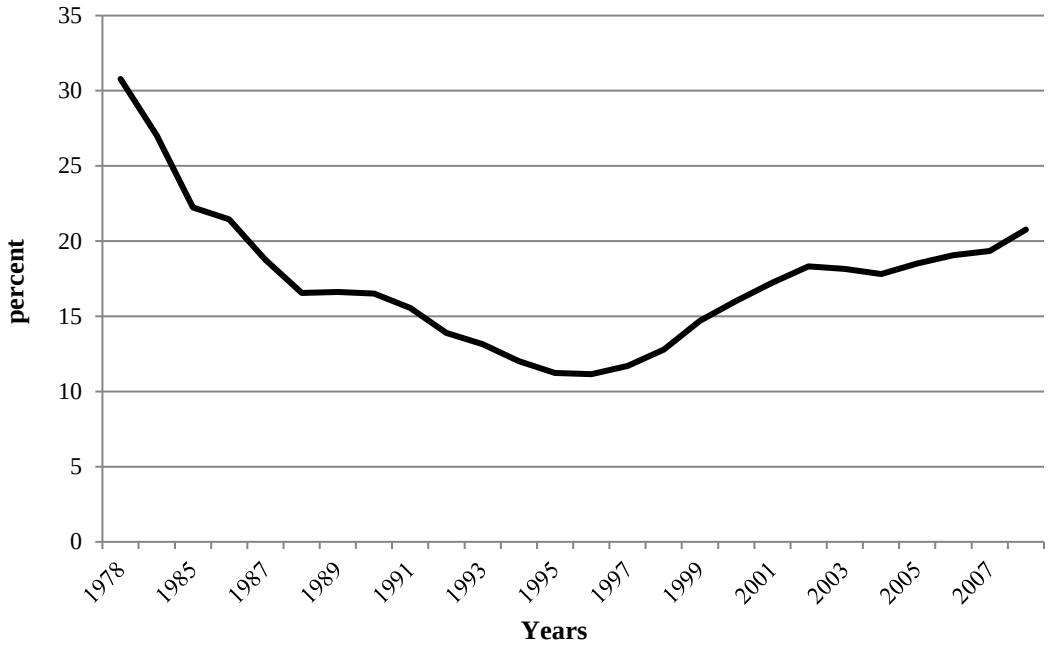
1. Introduction

In the 1980s the Chinese government initiated a campaign to shrink the Chinese public sector as well as make it more efficient. The objective was to move from a heavily planned economy to a more market-based one. Each five-year plan from 1982 to the most recent in 2013 have attempted to implement this policy (Cooke, 2003; Burns, 2003; Wang, 2010; Børdgard, 2014).

As Figure 1 shows, the initial attempts at reducing the size of the Chinese government seemed promising as public spending as a share of GDP fell from 1978-1996.[1] But this was not lasting and government spending has since increased. The obvious question is why?

Figure 1: Government spending as a share of nominal GDP



Answering this question is important because: (1) the Chinese economy measured using PPP exchange rates is currently the largest in the world and has considerable influence on world economic activity; (2) it is possible that the factors affecting the size of the Chinese government may be different from those affecting Western market-based economies and knowing this helps us better understand how transitional economies differ from market economies; and (3) it will help the Chinese government design more effective policies to meet its objective of smaller government.

[1] Publicly funded service units or *shiye danwei* consist of areas such as culture, education, public health, research, and national defense.

2. Literature

The factors explaining government size in China can be split into "economic", "social stability", and "political" factors. The most common economic factor is the level of development of an economy.[2] Wagner's Law (Wagner, 1994; Gandhi, 1971) proposes that as people become richer they demand more public goods and seek more income insurance through government programs, or that government spending has an income elasticity greater than one. A country with more young and old people will naturally result in government spending more on services such as education and health (Wu and Lin, 2012). If there are high fixed costs in producing government services, then countries with higher population densities may have lower marginal costs and lower proportionate levels of spending through scale economies in the provision of public goods. Being more open can lead to more volatile domestic incomes and induce governments to spend more to insure its citizens against fluctuations, or spend less to increase the competiveness of their exporters (Liberati, 2007).

One factor associated with social stability is the degree of ethnic diversity, as greater diversity could generate greater social conflict (Annett, 2001). This could lead to greater government spending to appease each ethnic group to ensure social peace. The degree of urbanization might also be tied to potential unrest. A more concentrated population might create greater resource disputes, or be better able to organize demonstrations and protests. Although an alternative but observationally equivalent hypothesis is that greater urbanization could cause an increased demand for government services that have public good features.

Political factors relate to a country's political system and its budgetary processes. Things such as the number of political parties or type of electoral system have little relevance to China. But other factors are likely relevant. One is the degree to which spending is decentralized, or the Leviathan hypothesis (Grossman, 1989; Zhu and Krug, 2005). The hypothesis is that greater centralization of government spending induces larger total government spending because of the monopolization of budgetary power by the national government. Another factor is the share of central government fiscal transfers to lower levels of government, also known as the Flypaper Effect (Hines and Thaler, 1995). By this argument, increased transfers promote collusion between different levels of government resulting in higher total government

[2] Kau and Rubin (1981) and Shelton (2007) discuss likely determinants of government size.

spending.[3] A different type of factor is existing government indebtedness, with greater government debt leading to greater spending obligations.

A number of studies have investigated the determinants of the size of the Chinese public sector. Wu and Lin (2012) study provincial government expenditures using a panel data set for the period 1998-2006. They find evidence that increased openness limits the size of provincial governments, and that there are economies of scale in the provision of provincial level public services. Their evidence does not support Wagner's law however, and the degree of urbanization, the dependency ratio, the urban unemployment rate, and minority population rate have no statistically significant impact on government size. Wu and Lin do find evidence that fiscal decentralization increases provincial government spending, other things equal.

Tobin (2005) looks specifically at Wagner's law and finds support for it between 1978-2001. Narayan, Nielsen, and Smyth (2008) find evidence supporting Wagner's law for some but not all provinces. Chen (2004) focuses on the relationship between provincial and central government and finds that increased fiscal decentralization leads to higher provincial government spending. He also finds that greater collusion between local and central government (as measured by extra-budgetary items) also increases government spending. Finally, Chen's results support Wagner's law. Lee and Vuletin (2012) focus on the flypaper effect in China and find support for it from 1980-2008. They also find that before China became a de facto federation around 1980, that the opposite of the flypaper effect occurred with central transfers tending to be rebated by provinces. In summary, previous studies have identified a number of determinants of government size in China. However, there is disagreement among the studies, raising concerns about robustness.

3. Data and method

The data consist of observations on 31 Chinese provinces, Municipalities, and Autonomous

[3] Our transfer variable is for 1995 onwards. Lee and Vuletin (2012) use a transfer variable from 1980 onwards. Their underlying assumption is that central government transfers equal provincial deficits from 1978-1993 based on the Budget Law in China which required balanced government budgets for all levels of sub-national governments. In practice this never happened. Even the current Budget Law still prohibits sub-national governments from borrowing without the approval of the central government. However, in practice many sub-national governments borrow explicitly or implicitly (Qiao and Shah, 2006). The borrowing data is officially unavailable but estimates of government debt exist, although they are unreliable.

Regions from 1978-2008.[4] The main sources are various years of the China Statistics Yearbook, the National Bureau of Statistics Yearbook, the Ministry of Finance Yearbook, the Local Fiscal Statistical Materials, and the Procuratorial Yearbook of China. The variables are defined in Table 1 (all are at the provincial level unless otherwise stated).

Table 1: Definitions of Variables

Variable	Definition
Government size	public sector spending as a % of nominal GDP (budget and extra-budget expenditures)
Wagner's Law	log per capita real GDP
Dependence Ratio	ratio of non-working to working population
Scale Economies	log provincial population divided by the land area of a province in km^2
Trade Openness	exports plus imports as a share of GDP
Ethnic Diversity	number of non-Han people to total population.
Urbanization	urban population as a share of total population
Fiscal Decentralization 1	ratio of per capita provincial expenditures to national per capita central expenditures
Fiscal Decentralization 2	ratio of per capita provincial expenditures to the sum of per capita central and provincial expenditures
Flypaper Effect	central government fiscal transfers as a share of total provincial revenue
Deficit Ratio	provincial government fiscal deficit as a % of GDP

The Chinese political and economic systems are noticeably different from those in Western countries which are used in most studies explaining the size of government. This makes model selection difficult because of a lack of a clear guidance from theory and empirical studies about which variables should be included in an empirical model. To avoid the arbitrary selection of our empirical model and to ensure our results are robust to model specification we use the approach of extreme bounds analysis (EBA) developed by Leamer (1985), Levine and Renelt (1992), and Sala-i-Martin (1997).[5] EBA systematically selects among competing alternative model specifications. The general form of the model is,

$$Y_{it} = \alpha + \beta_I I_{it} + \beta_M M_{it} + \beta_Z Z_{it} + \mu_{it}$$

where Y_{it} is the dependent variable, I_{it} includes explanatory variables that are the focus of a study, the M_{it} are explanatory variables that prior studies have shown to be significant, and the Z_{it} are variables for which there is no clear guidance from the existing literature. In our study, Y_{it} is the size of government measured by provincial government spending. The I_{it} and M_{it} variables are included in every estimated model specification and a search over combinations

[4] This excludes Hong Kong, Macau, and Taiwan.
[5] We use the ExtremeBounds function in R written by Marek Hlavac (Hlavac, 2013).

of the Z_{it} variables is then used to find the model of best fit. We assume that real GDP per capita, the dependence ratio, and population density are sufficiently common in studies and also likely to be relevant factors in China that we treat them as M_{it} variables. All remaining explanatory variables will be considered as Z_{it} variables (and by implication I_{it} variables since they all of potential interest).

The first estimation method uses the between estimator (31 observations). Hauk and Wacziarg (2009) find that the between estimator outperforms other panel data estimators when estimating growth models. The second uses fixed effects estimation of three panels involving five year average values of variables (93 observations).

4. Results

Tables 2 and 3 contain the results. Results for the Sal-i-Martin criterion are presented, although robustness using the Leamer criterion is also indicated. A variable meets the Sal-i-Martin criteria if 95 percent of the density function of the estimates of its coefficient lie to the right or left of zero. The Leamer criterion is much stricter. Take the lowest and highest estimates of a coefficient across all possible model specifications. The criteria requires that the range from the smallest value of a confidence interval around the lowest estimate to the largest value of a confidence interval around the highest estimate not straddle zero.

Consider the between estimator results. The signs of real GDP per capita (Wagner's Law), the dependence ratio, population density (scale economies), fiscal transfers (flypaper effect) and the deficit ratio are consistent with theoretical predictions. The signs of ethnic diversity and fiscal decentralisation are not as predicted. The predicted signs of openness and urbanisation are undetermined and since no estimates are significant their estimated signs seem of little interest. The only robust variables using the Sal-i-Martin criteria are the political factors of fiscal decentralisation, the deficit ratio (for measure 1 of fiscal decentralisation) and fiscal transfers (for measure 2 of fiscal decentralisation). They are also significant in each case.

The panel estimates have some noticeable differences from the between estimates. Central transfers are no longer significant nor meet the Salai-Martin criteria. The estimates of real GDP per capita and trade openness switch sign. But the deficit ratio and both measures of fiscal decentralisation remain robust and significant. Using regional fixed effects with provinces

categorised into Eastern, Central, or Western produced no noticeable changes and the regional variables were insignificant and fragile.

One general conclusion is that political factors dominate other factors. As provincial governments run fiscal deficits they have to meet interest and principal repayment obligations. The estimates for this factor are consistent with this prediction. The degree of fiscal decentralisation is also significant and robust. The puzzle is that our estimates imply provincial governments with a greater fiscal role spend more, which is the opposite of the Leviathan hypothesis. One possibility is that the central government experiences less pressure to respond to local political conditions and is thus more frugal than provincial governments which are more deeply ingrained in local affairs. This is more likely the less mobile is a provincial population as there will then be less inter-jurisdictional competition, which has typically been the case in China.

In contrast, factors normally found to be significant in studying Western style market economies are insignificant. For example, the estimates imply that demand for public goods is ignored as people become wealthier. Or, Wagner's law does not hold. Similarly for the rise in urbanisation or the increase in dependents. The insignificant and fragile estimate for ethnicity could be interpreted as provincial governments using political and legal control rather than spending on amenities or income support to counter any potential unrest.

5. Conclusion

This study finds that the robust determinants of the size of Chinese provincial governments are the degree of fiscal decentralisation, transfers from the national to provincial governments, and the deficits of provincial governments. Interestingly, none of the variables identified as significant in previous studies are found to be robust or significant. Roughly speaking, political factors seem to dominate economic or social stability factors in determining provincial government spending. It seems clear now why repeated government attempts to reduce the relative size of the Chinese government sector have failed. Our findings suggest that this is because ultimately the political factors determining government spending haven't changed. Until these underlying political priorities change, whatever they are, then attempts to reduce the relative size of the Chinese government sector will likely fail.

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Table 2: Government Spending and Average of 1978-2008 Variables

Variables	Coefficients with Fiscal Decentralisation 1						Coefficients with Fiscal Decentralisation 2					
	Min	***Max***	***Mean***	***Fraction significant***	***% above 0***	***CDF non-normal***	***Min***	***Max***	***Mean***	***Fraction significant***	***% above 0***	***CDF non-normal***
Log Per Capita Real GDP	-8.015 (2.834)	10.790 (10.988)	0.501 (4.536)	19.05	49.21	53.59	-8.053 (4.699)	10.790 (10.988)	1.545 (5.916)	4.76	53.97	59.74
Dependence Ratio	-4.057 (16.241)	69.178 (55.857)	19.271 (27.262)	0.00	76.19	68.38	-4.057 (16.241)	73.639 (48.755)	27.732 (29.670)	0.00	90.48	80.49
Log Population Density	-5.562 (2.618)	0.727 (0.964)	-1.503 (1.299)	23.81	12.70	72.27	-5.562 (2.618)	1.480 (1.703)	-0.624 (1.518)	11.11	44.44	65.43
Trade Openness	-0.134 (0.171)	0.054 (0.142)	-0.020 (0.114)	0.00	37.50	55.32	-0.166 (0.135)	0.054 (0.142)	-0.047 (0.119)	0.00	25.00	64.49
Ethnic Diversity	-7.722 (6.429)	1.672 (2.228)	-0.700 (3.305)	0.00	50.00	50.94	-7.722 (6.429)	2.632 (2.963)	-0.720 (3.775)	0.00	46.88	57.26
Urbanisation	-9.756 (23.146)	13.126 (9.030)	2.866 (13.713)	12.50	68.75	64.74	-20.414 (32.990)	13.126 (9.030)	-0.739 (16.559)	12.50	50.00	51.53
Fiscal Decentralisation	2.372 (0.752)	4.204 (1.713)	3.011 (0.951)	100.00	100.00	99.65*†	44.881 (16.274)	108.183 (40.094)	66.012 (25.229)	84.38	100.00	99.28*
Central Transfers	0.074 (0.069)	0.497 (0.194)	0.264 (0.141)	50.00	100.00	93.49	0.139 (0.109)	0.497 (0.194)	0.307 (0.155)	50.00	100.00	96.96*
Deficit Ratio	0.561 (0.139)	0.561 (0.139)	0.655 (0.156)	100.00	100.00	99.95*†	0.555 (0.570)	0.834 (0.130)	0.671 (0.359)	50.00	100.00	94.89

Notes: Provincial public sector spending as a % of GDP is the dependent variable and includes a constant. Fraction significant includes all cases of significant estimates regardless of their sign. CDF non-normal is the proportion of the CDF of the estimated coefficient not assuming normality. Robust standard errors are reported in parentheses. Robust variables using the Sala-i-Martin (1997) 95% criteria have their CDF > 0.95 and are indicated by *. Robust variables using the Leamer (1985) criteria are those which the lower and upper extreme bounds have the same sign calculated using the 95 percent confidence intervals for the Max and Min estimates and are indicated by †.

Table 3: Government Spending and 5 Year Panels Between 1994-2008

Variables	Coefficients with Fiscal Decentralisation 1						Coefficients with Fiscal Decentralisation 2					
	Min	***Max***	***Mean***	***Fraction significant***	***% above 0***	***CDF non-normal***	***Min***	***Max***	***Mean***	***Fraction significant***	***% above 0***	***CDF non-normal***
Log Per Capita Real GDP	-8.794 (2.022)	9.401 (2.983)	-0.924 (1.753)	65.08	42.86	59.99	-8.690 (2.989)	9.401 (2.983)	-1.387 (1.951)	55.56	42.86	58.85
Dependence Ratio	-5.090 (8.151)	64.057 (16.708)	19.263 (9.249)	52.38	90.48	86.33	-5.090 (8.151)	64.057 (16.708)	19.112 (9.770)	41.27	80.95	81.60
Log Population Density	-5.357 (1.098)	0.331 (0.266)	-1.652 (0.657)	42.86	19.05	78.46	-5.357 (1.098)	1.578 (0.317)	-0.794 (0.693)	49.21	44.44	52.91
Trade Openness	-0.054 (0.023)	0.079 (0.043)	0.003 (0.024)	18.75	56.25	52.59	-0.053 (0.025)	0.079 (0.043)	0.007 (0.025)	12.50	62.50	56.57
Ethnic Diversity	-8.591 (2.913)	0.331 (1.049)	-2.504 (1.661)	25.00	6.25	80.67	-8.591 (2.913)	0.331 (1.049)	-2.626 (1.717)	25.00	9.38	78.08
Urbanisation	-5.261 (9.653)	9.478 (2.588)	3.489 (4.398)	50.00	75.00	76.42	-10.255 (6.165)	9.478 (2.588)	2.031 (4.369)	25.00	75.00	69.58
Fiscal Decentralisation	1.150 (0.136)	3.299 (0.612)	2.068 (0.398)	100.00	100.00	100.00*†	41.746 (5.389)	99.355 (15.396)	68.320 (10.315)	100.00	100.00	100.00*†
Central Transfers	-0.066 (0.025)	0.488 (0.083)	0.135 (0.056)	59.38	62.50	63.56	-0.022 (0.032)	0.488 (0.083)	0.188 (0.053)	50.00	62.50	70.68
Deficit Ratio	0.711 (0.068)	0.985 (0.044)	0.868 (0.047)	100.00	100.00	100.00*†	0.832 (0.063)	0.985 (0.044)	0.912 (0.046)	100.00	100.00	100.00*†

Notes: Provincial public sector spending as a % of GDP is the dependent variable, includes a constant and time fixed effects. Fraction significant includes all cases of significant estimates regardless of their sign. CDF non-normal is the proportion of the CDF of the estimated coefficient not assuming normality. Robust standard errors are reported in parentheses. Robust variables using the Sala-i-Martin (1997) 95% criteria have their CDF > 0.95 and are indicated by *. Robust variables using the Leamer (1985) criteria are those which the lower and upper extreme bounds have the same sign calculated using the 95 percent confidence intervals for the Max and Min estimates and are indicated by †.